DOCUMENT RESUME

ED 039 503 AC 008 118

| | |
|---|---|
| TITLE | Training Guidelines: Hand Blowing, Pressing, & Shaping of Glass. |
| INSTITUTION | Ceramics, Glass, and Mineral Products Industry Training Board, Harrow (England). |
| NOTE | 42p. |
| EDRS PRICE | EDRS Price MF-$0.25 HC-$2.20 |
| DESCRIPTORS | *Craftsmen, Employment Qualifications, *Glass, *Guidelines, *Industrial Training, Skill Development, Task Analysis, Trade and Industrial Education |
| IDENTIFIERS | Great Britain |

ABSTRACT

This manual of training guidelines describes the procedure for personnel intake and traces the training process which a worker must go through to become a glass craftsman. A number of charts present the skills and items of knowledge which the individual craftsman must master. Examples are included of theoretical and practical test items to certify the worker's skill in hand blowing of glass. Other skills discussed are those of hand presser, gatherer, marver, ladler, and taker-in. An appendix on personnel specifications describes personal characteristics, educational background, etc., which an individual should possess to be considered for training. (MF)

Ceramics
Glass and
Mineral Products
Industry
Training Board

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED039503

# Training Guidelines

# Hand Blowing Pressing & Shaping of Glass

AC008118

EDO 39503

CERAMICS, GLASS AND MINERAL PRODUCTS INDUSTRY

TRAINING BOARD

GLASS COMMITTEE

# Guidelines for training in the hand blowing, pressing and shaping of glass

## INTRODUCTION

Efficient training can make a substantial contribution to the profitability of a company. Craftsmen capable of applying a high degree of skill to a wide range of products will ensure manufacturers the flexibility demanded by changing markets. The object of these guidelines is to help employers prepare progressive training schemes which will provide such men. They may be of value both when current training methods are re-examined and when new systems are considered.

The guidelines were prepared by a group of specialists attached to the Glass Committee (see Appendix A). Training practice in the U.K. and western Europe was carefully studied and the Glass Manufacturers' Federation report "A Basic Scheme for Semi-Automatic Operatives in the Glass Industry" was found particularly helpful.

### Definition of a craftsman

For the purpose of its Grant Scheme the Board has published a definition of a craft occupation (see Appendix B). However, local conditions which employers accept in identifying their craftsmen vary. For the purpose of training it is RECOMMENDED that a man employed in the hand blowing, pressing and shaping of glass should be defined as a craftsman IF HE HAS BEEN THROUGH AT LEAST THREE OF THE TRAINING STAGES SUGGESTED IN THESE GUIDELINES AND HAS RECEIVED APPROPRIATE FURTHER EDUCATION.

### The basis of the training programme

As a preliminary to designing a training programme a job description, job analysis and personnel specification must be prepared. Examples of these are given in Appendices C, D and E.

### Training by stages

A system of training which builds up skills and knowledge in stages appears to be particularly suited to the crafts of hand blowing, pressing and shaping. Each of the stages suggested here consists of a skill or group of skills which analysis shows to be a viable unit in the job situation. It consists of a training element, an experience element and a further education element.

The time required to complete each stage will vary according to its content and the circumstances within an individual firm. The order in which they are tackled will also vary but satisfactory completion of a number of stages will usually provide a recognised level of qualification.

## SEQUENCE OF TRAINING

If a trainee is to become a skilled and versatile craftsman he must pass through several phases of training and planned experience. Then, later in his career, the skilled craftsman will need further knowledge as new products are manufactured.

Training programmes should be designed not only to equip the trainee with the skills and knowledge fundamental to the performance of his job but to prepare him for wider experience within his current function and for promotion to higher skills and responsibilities. Training will probably follow a pattern of induction, preliminary training, basic job training, advanced job training and refresher courses as required.

### Induction

A short induction period introduces the trainee to the company, working procedures and working environment. This will normally take one or two days and will be carried out off the job, perhaps in an office or training centre. (See Appendix F).

### Preliminary training

The next stage is to acquaint the trainee with his immediate working environment - the department. He needs to be introduced to the process and associated equipment and helped to understand the reasons for carrying out the job in the correct manner. It is important that the trainee is fully familiar with everything which will affect his well-being within the department.

This period also provides an opportunity for assessing the trainee's potential ability.

### Basic job training

A sound basis on which to build future skills and knowledge is essential. This stage of the training will mainly consist of job instruction in the production situation.

### Planned experience

Skills acquired during the basic job training period need to be developed and consolidated by planned experience. Much of this will be in the production situation but it should be carefully supervised and evaluated. This is an important part of training since it provides the trainee with the opportunity to acquire the degree of expertise appropriate to the job.

## Advanced job training

Periods of advanced job training should occur throughout the craftsman's career, whenever he needs to acquire speed and quality with new or unfamiliar products. Training may take the form of planned practice off the job or the trainee may work as a supernumerary for short periods, and the situation may provide an opportunity for short talks giving information about market conditions or company developments. This helps the craftsman to understand his role within the whole background and purposes of his company.

## Job knowledge

The trainee will need knowledge right from the start about safety, good housekeeping, fire prevention, customers' requirements, quality and cost. As a craftsman his knowledge should also cover raw materials, different types of glass, temperature control and other basic technical information.

## TRAINING METHODS

Training methods will differ according to the local circumstances. It is however suggested that training aids (Appendix G) should be used in the programme whenever possible.

## Off the job training

Preliminary exercises may take place off the job, in an area set apart from production conditions. This enables the trainee to become familiar with the tools and gain confidence in handling them before he is placed in the production situation. For instance, one furnace may be set aside specifically for training purposes and manned by a team of trainees under the guidance of an instructor.

## On the job training

Training can also take place on the job. In this case the trainee may work as a member of a production team under the guidance of an instructor or craftsman.

Alternatively, he may be supernumerary (extra to the normal complement of a production team) and rotate to various teams or "chairs" according to a predetermined programme. This ensures that he gains increasing experience of a range of products. While working like this the trainee may temporarily replace more skilled employees in order to practise skills and may contribute to the output of the department.

## RECORDS OF PROGRESS

Whether training is on or off the job, the trainee's progress will need to be recorded. This will enable management to observe his progress in the acquisition of basic skills, measured in speed and quality of performance, the range of products in which the trainee is involved at specific periods of his training and the job knowledge he has acquired.

It is equally important that the trainee should be aware of his own progress and fully understand the attention being given to his development. This will ensure a high standard of craftsmanship and versatility on completion of training.

## SUGGESTED TRAINING PROGRAMMES

The probable progress of a trainee from his induction into the job through the various stages is shown below. The details of each stage are shown in the appendices.

| | Induction Training | 1 Preliminary Training | 2 Basic Job Training | 3 Job Training | Further job training and experience as dictated by company's products, market demands, etc. |
|---|---|---|---|---|---|
| Hand Blowing | Induction | Gatherer | Gatherer | a) Marver<br>b) Ballmaker (off the ball or continental)<br>c) Blower (clean iron)<br>d) Blower (off the ball) | |
| Pressing | Induction | Taker in, taker out or burner | Gatherer or ladler | Presser | |
| Press and blow | Induction | Taker in-blower | Gatherer or ladler | Presser | |
| Suck and blow | Induction | Taker in-blower | Gatherer | Parison maker - cutter | |

## DURATION OF TRAINING

Because of the range of ware produced and the diversity of practices in the glass industry it is not possible to recommend specific lengths of time for training. However, a training programme should be devised to ensure that the trainee reaches a high standard of performance in each stage as quickly as possible. This will mean making the best possible use of all the internal and external facilities available.

## STANDARDS OF PERFORMANCE AND ASSESSMENT

Each employer will need to set standards of performance according to the type of product, the skills required to make it and the speeds and quality demanded by the situation. The appraisal of a trainee's performance against such standards is an accurate means of assessing his progress through the training programme. Careful assessment will indicate weaknesses which require special attention before he moves on to the next stage.

One or more of the following methods can be used in the process of assessment:

a) formal and informal questioning by instructors and supervisors

b) progress reports

c) a simply designed question paper to reveal knowledge of the job

d) a series of practical tests based on time and level of performance: such tests may cover a range of products of increasing complexity. (See Appendix N).

## ASSOCIATED FURTHER EDUCATION

So that the craft trainee may acquire knowledge to complement the skills learned, he should be encouraged to attend an appropriate course of further education. Preferably this should be certificated by the City and Guilds of London Institute.

## MANAGEMENT RESPONSIBILITY

Responsibility for training should be allocated to a senior member of management. His responsibilities would be

a) identifying current and future training needs and planning suitable training programmes

b) providing qualified instructors

c) ensuring adherence to training programmes and maintenance of satisfactory standards of achievement

d) ensuring preparation of regular training reports and records of progress

e) assisting with recruitment and selection of trainees as required.

## INSTRUCTORS

The type of instructor will vary according to the circumstances. He may be a full time or part time specialist, a supervisor with instructing responsibilities or an experienced senior craftsman. In all cases management should ensure that he has the requisite knowledge and experience of the job and is qualified in methods of instruction. The Board's Information Paper No.4 "Qualified to Instruct?" gives guidance on this subject.

APPENDIX A

## WORKING PARTY ON CRAFT OCCUPATIONS

| | | |
|---|---|---|
| R.H. Haigh (Chairman) | - | Transport & General Workers' Union |
| L. Eyre | - | Nazeing Glass Works Limited |
| F.K. Lax | - | Lax & Shaw Limited |
| B.T. Love | - | Pilkington Brothers Limited |
| D.C. Marshall | - | G.H. Zeal Limited |
| G.S. Meek | - | James A. Jobling & Company Limited |
| K. Pearson | - | Doncaster Technical College |
| D. Rider | - | Glass Manufacturers' Federation |
| A. Wright | - | Thermal Syndicate Limited |
| D. Hammond | - | Thomas Webb & Sons |

## SUB GROUP ON HAND BLOWING, PRESSING AND SHAPING

G.S. Meek (Chairman)

K. Pearson

R.H. Haigh

D. Hammond

L. Eyre

B.T. Love

| | | |
|---|---|---|
| W.H. Bennett | - | Trent Valley Glassworks Limited |
| F. Goodwin | - | Glass Tubes & Components Limited |
| T. Webb | - | Webb Corbett Limited |

## STAFF

| | | |
|---|---|---|
| G.C. Ward | - | Chief Training Officer, Glass |
| W.R. Duncan | - | Senior Training Adviser, Glass |

APPENDIX B

## EXTRACT FROM GRANT SCHEME 1968/1969 SECTION H

**Definitions**

**Craft**

(1) Craft trainees may be either apprentices to the skilled crafts or others training for occupations which, although not necessarily designated as skilled crafts, have similar requirements. These occupations generally call for:

(a) a substantial degree of practical skill

(b) the ability to exercise this skill over a wide range of operations and in a variety of circumstances

(c) the capacity to apply the skills of the craft without constant and close supervision and in doing so to make intelligent use of standard forms of instruction (e.g. drawings and specifications) and where called for by the nature of the work to make routine calculations, apply measuring instruments and perform similar operations

and

(d) the ability to acquire the technical knowledge complementary to the practical skills of the craft necessary for a technically informed understanding of the materials and techniques used, and for the selection of the best method of tackling a particular job. (This definition is based on that given in the monograph entitled 'Further Education for Craftsmen', published by the City and Guilds of London Institute in April, 1964.)

(2) A craft trainee receives planned comprehensive practical training in a recognised craft or similar occupation together with the associated further education, e.g. a City and Guilds or similar course.

APPENDIX C

## EXAMPLE JOB DESCRIPTION

## HAND PRESSING

JOB TITLE - GATHERER

| | |
|---|---|
| OPERATION | Skims glass where necessary.<br><br>Gathers glass on iron to correct weight and allows glass to run off iron into mould.<br><br>Allows excess glass to run into bosh. |
| PRODUCTION REQUIREMENTS | Glass pressings for domestic ware and light fittings. |
| MATERIAL | Glass suitable for domestic ware and light fittings. |
| TOOLS AND EQUIPMENT | Gathering iron.<br><br>Skimming iron.<br><br>Bosh |
| QUALITY CONTROL | Receives reports from presser on necessity to clean or skim glass. |
| JOB RESPONSIBILITY | Ensures good working practice by the team and reports to presser. |
| DEFINITION OF PROCESS | Production of pressed glassware. |

APPENDIX D

## EXAMPLE JOB ANALYSIS

## OPERATION - GATHERING

MATERIALS & EQUIPMENT - POT FURNACE, GLASS AT CORRECT TEMPERATURE, GATHERING IRONS

| Left Hand | Attention points | Right Hand |
|---|---|---|
| Pick up iron from pre-heating zone | Inspect for correct temperature (dull red heat) and cleanliness | Pick up iron from pre-heating zone |
| Position iron in mouth of pot | Inspect surface of metal in pot | Position iron in mouth of pot |
| Place iron on edge of pot mouth | | Raise iron to correct angle and rotate |
| Re-grasp iron at top, assist right-hand | Watch iron enter metal | Push iron into metal, continue rotation |
| Assist right-hand | When gathered correct sight & feel; glass must not fall back into pot | Lower end of iron, raising nose from pot, increase speed of rotation |
| Re-grasp iron, assist right-hand | Watch gather shape | Withdraw iron from pot, continue rotation |
| Support iron and assist right-hand rotation | Gather shape consistent on iron | Withdraw iron from pot |
| Lift iron clear of pot mouth or block, continue rotation more slowly, present iron | Watch iron does not touch pot mouth, inspect gather | Withdraw iron from mouth, assist left-hand, continue rotation, present iron |

APPENDIX E

## PERSONNEL SPECIFICATION - INCLUDING RECRUITMENT AND SELECTION

The considerable investment of time and money which will be spent in training a potential craftsman necessitates careful attention to selecting suitable candidates who are mentally and physically capable of achieving high standards of performance in the limited period defined by individual employers.

The following items should be considered in defining the type of individual who will be suitable for training as glass blower

(a) Physique

Good standard of health, ability to stand hot conditions and irregular hours. Average height and no disability which would prevent him standing throughout the shift. Reasonable vision.

(b) Attainment

Average school education.

(c) General intelligence

Average in relation to general population.

(d) Special aptitudes

Ability to understand simple mechanical principles as relating to moulds, manipulation of tools such as blowing irons.

(e) General

Should be reliable and steady as he will form part of a team or shop, should be acceptable to others and should have a sense of responsibility.

The sources of recruitment will vary according to local circumstances and will include young men submitted to employers by the Youth Employment Service, Schools Careers Officers and through other means of recommendation.

It is recommended that employers should select according to the merits of the individual and in making a selection should draw on all available information which could include:

(a) school record card,
(b) previous job history,
(c) personnel interview,
(d) intelligence and aptitude tests.

APPENDIX F

## INDUCTION COURSE

The course is designed to familiarise the trainees with their environment and the overall working conditions and it might consist of much of the following:

1. Working rules and conditions. Company rules and regulations. Factories Act. Time keeping. Hours of work. Areas of supervision and responsibility.

2. Welfare - sickness and pension benefits. Travel and holidays. Committees - social and sports club. Canteen.

3. Pay and conditions. How his pay will be made up. Stoppages, P.A.Y.E. How and where he is paid. Where he can query the make up of his pay.

4. Safety - workshop safety and relevant legislation. Hygiene and industrial health. Accident prevention and occupational hazards. Elementary first aid and location of facilities. Lifting and carrying. Reporting accidents.

5. Consulation and negotiating arrangements. Trade Unions, shop stewards. Grievances and disputes procedure. Joint productivity councils. Workmen's inspection.

6. Promotion possibilities. What is possible. What is available - training and education courses. Encouragement.

7. The importance of the job. The company, its products and achievements. Where the products go, how they are used. What it means to the country. Where he fits in the company. What his part means to the whole.

8. Geography. Tour of the works. The working place. The relevant offices. The facilities. The appropriate supporting service department.

APPENDIX G

## TRAINING AIDS

The following lists suggest training aids currently available:

### FILMS

A. "Well I'm Blowed" available from - Sound Services Ltd.,
Wilton Crescent,
Merton Park,
London, S.W.19.

B. "Glas" " " - Contemporary Films,
14, Soho Square,
London, W.1.

C. "Crystal" " " - Gauntlet Productions,
16, Grosvenor Road,
Handsworth Wood,
Birmingham 20.

### LITERATURE

A. Several examples of informative and descriptive publications are available from - The Glass Manufacturers' Federation,
19, Portland Place,
London, W.1.

B. "Glass Defects - Causes and Corrections" - a booklet published by EMHART, identifies principal defects by appearance and specifies causes and corrective action.

C. Diagrams are available as follows:

1. Blowing Semi-Automatic - DA2/RT21
2. Blowing Mouth - D.A.1.
3. Hand or Automatic Pressing - D.J.

These charts are available from The Glass Manufacturers' Federation at the above address.

### EQUIPMENT AND SIMULATORS

(a) A cold set of hand equipment could be used in an off the job situation.

(b) Moulds and ancillary equipment, if possible supplemented by examples of damage through mishandling.

(c) Certain chemicals which have similar flow characteristics to molten glass are now available and can be used as simulators in off the job training situations.

i) AROCLOR 1260 obtainable from Monsanto Chemicals

ii) Standard grade Wilpeel Strippable, available from Wilkins and Campbell Co. Ltd.

MISCELLANEOUS

a) A library of defective glassware, labelled with defects and causes which covers the company's range of production.

b) Photographs of defective ware related to customers' problems.

c) Charts and diagrams showing temperature variations and control, etc.

APPENDIX H

## INDUCTION TO THE WORKING SITUATION

Objective - To acclimatise the recruit to production conditions.

Syllabus

1. Glass, what it is, its importance, the British glass industry.
2. The company and its products.
3. Factory facilities - e.g. personnel, welfare facilities, pay, canteen.
4. The department, persons to whom the trainee is directly responsible.
5. Accident prevention.
6. Particular hazards of the job.
7. Safe working practices.
8. Use of protective equipment.
9. Fire prevention.
10. Fire drill.
11. Use of firefighting equipment.
12. Location of equipment and emergency exits.
13. First aid.
14. Good housekeeping.
15. The trainee's responsibilities.
16. Future pattern of training.

At this stage the trainee will assist in general duties in the department, under the supervision of a reliable experienced craftsman or preferably an instructor. He will be encouraged to watch all aspects of the process and to ask questions.

# TRAINING PROGRAMME FOR HAND BLOWERS

## (CLEAN - IRON BLOWING OR MARVER)

INDUCTION TRAINING

| | | |
|---|---|---|
| STAGE 1 | PRELIMINARY TRAINING | |
| STAGE 2 | JOB TRAINING | - GATHERER |
| STAGE 3 (A) | JOB TRAINING | - MARVER |
| STAGE 3 (B) | JOB TRAINING | - BALL MAKER |
| STAGE 4 (A) | JOB TRAINING | - BLOWER (CLEAN IRON) |
| STAGE 4 (B) | JOB TRAINING | - BLOWER (OFF THE BALL) |

## STAGE 1 - PRELIMINARY TRAINING - GATHERER

Objective: To give the trainee a thorough understanding of the equipment and preparation for blowing and to help him understand the reasons for doing a job in the prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Equipment used in blowing.<br>2. Functions of forehearth.<br>3. Reasons for skimming, warming blowing irons and preparing noses.<br>4. Related departments - mixing, melting, costs and inspection. | 1.<br>a. Preparing tank.<br>b. Use of solophane (wetting agent).<br>c. Use of warming irons.<br>d. Skimming.<br>2. Identification of glass faults.<br>3. Safe working habits and use of protective equipment.<br>4.<br>a. Reading job orders.<br>b. Preparation of forebay.<br>c. Selection of blowing irons.<br>d. Selecting tank and forming block. |

## STAGE 2 - JOB TRAINING - GATHERER

Objective: To give the trainee a thorough understanding of gathering, the equipment to be used, and the reasons for doing the job in a prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Equipment to be used, blocks etc.<br>2. Temperature-recording systems.<br>3. Importance of gather being correct amount for the final article.<br>4. Related departments - mixing, melting inspection. | 1. Block correction.<br>2. Gathering set amounts of glass.<br>3. Temperature adjustment.<br>4. Safe working habits and use of protective equipment.<br>5. Identifying glass faults. |

## STAGE 3 (A) - JOB TRAINING - MARVER

Objective: To establish the trainee as an efficient and responsible blower who will be responsible for the overall efficiency of the shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Theory of gathering (blowing irons, gathering ring and bosh).<br>2. Forming of glass and faults which can occur.<br>3. Plugging and faults which can occur.<br>4. The combination of gathering and forming.<br>5. The combination of gathering, forming and plugging.<br>6. The combination of gathering, forming, plugging and manipulation of metal. (To be repeated to cover whole range of company's products).<br>7. Correct positioning of glass in mould, importance of placing one's own body in relation to iron, matching iron to height of person, importance of turning in the mould whilst blowing.<br>8. Importance of good quality, types of faults and reasons.<br>9. How to interpret feed back on quality, emphasising co-operation with quality control department.<br>10. Related departments - costs, mixing, melting etc.<br>11. Principles of job instruction e.g. Training Within Industry (T.W.I.) | 1. Gathering.<br>2.<br>a. Forming.<br>b. Plugging.<br>c. Gathering and plugging.<br>d. Gathering, forming and plugging.<br>e. Forming, plugging and manipulation of metal.<br>3.<br>a. Positioning glass in mould.<br>b. Placing body in relation to mould.<br>c. Matching irons to height of trainee.<br>d. Turning in the mould whilst blowing.<br>4. Glass faults - recognition and correction.<br>5. Safe working habits and use of protective equipment. |

## HAND BLOWERS (OFF THE BALL OR CONTINENTAL)

### STAGE 3 (B) - JOB TRAINING -
### BALLMAKER AND 2ND BALLMAKER

Objectives: To give the trainee a thorough understanding of ball-making and the equipment to be used, and the reasons for doing the job in a prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Equipment used in ballmaking i.e. irons etc.<br><br>2. Function of forehearth.<br><br>3. Reasons for skimming, warming blowing irons and preparing noses.<br><br>4. Related departments - mixing, melting, costs and inspection.<br><br>5. Importance of ball being even weight and size. | 1.<br>a. Preparing tank.<br>b. Use of solophane (wetting agent).<br>c. Use of warming irons.<br>d. Skimming.<br>e. Preparing noses.<br><br>2. Gathering correct amount of glass.<br><br>3. Making a good ball of even weight and size.<br><br>4. Identifying glass faults.<br><br>5. Safe working habits and the use of protective equipment. |

## STAGE 4 (A) - JOB TRAINING - BLOWER (CLEAN IRON)

Objective: To establish the trainee as an efficient and responsible blower who will be responsible for the overall efficiency of the shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Theory of gathering (blowing irons, gathering ring and bosh).<br>2. Forming of glass and faults which can occur.<br>3. Plugging and faults which can occur.<br>4. The combination of gathering and forming.<br>5. The combination of gathering, forming and plugging.<br>6. The combination of gathering, forming, plugging and manipulation of metal. (To be repeated to cover whole range of company's products).<br>7. Correct positioning of glass in mould, importance of placing one's own body in relation to iron, matching iron to height of person, importance of turning in the mould whilst blowing.<br>8. Importance of good quality, types of faults and reasons.<br>9. How to interpret feed back on quality, emphasising co-operation with quality control department.<br>10. Related departments - costs, mixing, melting etc.<br>11. Principles of job instruction e.g. Training Within Industry (T.W.I.) | 1. Gathering.<br>2.<br>a. Forming.<br>b. Plugging.<br>c. Gathering and plugging.<br>d. Gathering, forming and plugging.<br>e. Forming, plugging and manipulation of metal.<br>3.<br>a. Positioning glass in mould.<br>b. Placing body in relation to mould.<br>c. Matching irons to height of trainee.<br>d. Turning in the mould whilst blowing. |

## STAGE 4 (B) - JOB TRAINING - BLOWER (OFF THE BALL)

Objective: To establish the trainee as an efficient and responsible blower who will be responsible for the overall efficiency of the shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. The forming of glass and faults which can occur.<br><br>2. Plugging and faults which can occur.<br><br>3. The combination of blocking and forming.<br><br>4. The combination of blocking and forming and manipulation of metal. (To be repeated to cover the whole range of company's products).<br><br>5. Correct positioning of glass in mould, importance of placing one's own body in relation to iron, matching iron to height of person, importance of turning in the mould while blowing.<br><br>6. Importance of good quality, types of faults and reasons.<br><br>7. How to interpret feed back on quality, emphasising co-operation with quality control department.<br><br>8. Talks by related departments - costs, mixing and melting. | 1.<br>a. Forming.<br>b. Blocking.<br>c. Forming and blocking.<br>d. Forming and blocking and manipulation of metal.<br><br>2.<br>a. Positioning glass in mould.<br>b. Placing body in relation to mould.<br>c. Matching irons to height of trainee.<br>d. Turning in the mould whilst blowing.<br><br>3. Glass faults - recognition and correction.<br><br>4. Safe working habits and use of protective equipment. |

## TRAINING PROGRAMME FOR HAND PRESSERS

INDUCTION TRAINING

STAGE 1 - PRELIMINARY TRAINING (TAKER IN, TAKER OUT, BURNER)

STAGE 2 - JOB TRAINING - GATHERER AND LADLER

STAGE 3 - JOB TRAINING - PRESSER

## STAGE 1 - PRELIMINARY TRAINING

Objectives: To assess the potential of the recruit and to ensure he can carry out the duties of a taker in, burner and taker out and understand the reason for doing the jobs in the prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Main duties of taker in.<br>2. Glass faults visible at this stage.<br>3. Work of related departments - mixing, melting, costs.<br>4. Importance of good housekeeping. | 1. Carrying article from press to lehr.<br>2. Packing articles in the lehr.<br>3. Identifying glass faults e.g. crizzles, splits, shear marks and slight flush.<br>4. Safe working habits and use of protective equipment. |
| 1. Main duties of burner.<br>2. Glass faults visible at this stage.<br>3. Work of related departments - mixing, melting, costs, etc.<br>4. Importance of good housekeeping. | 1. Using burner.<br>2. Identifying glass faults e.g. crizzles, splits, shear marks and slight flush.<br>3. Safe working practice and use of protective equipment. |
| 1. Main duties of taker out.<br>2. Glass faults visible at this stage.<br>3. Work of related departments - moulds, cost and quality.<br>4. Presser's job.<br>5. Equipment used by taker out. | 1. Taking articles out of mould using either:<br>vacuum take out, inverting moulds or tongs.<br>2. Assisting presser to handle hot moulds, either rotating table or moving mould from under plug.<br>3. Safe working practice and use of protective equipment. |

## STAGE 2 - JOB TRAINING - GATHERER AND LADLER

Objective: To establish the recruit as a responsible and efficient gatherer and ladler and to ensure that he understands the reason for doing the job in the prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Main duties of gatherer and ladler.<br>2. Interpreting job orders.<br>3. Irons and ladles, how to select an iron for a particular job.<br>4. Use of clay on irons.<br>5. Related departments - melting (including setting forebay mouth) temperature control, and reasons for skimming, costs etc.<br>6. Quality control and specifications with particular reference to weight. | 1. Use of irons and ladles, including selecting correct iron and shaping the clay nose.<br>2. Temperature adjustment, setting forebay mouth (consulting tank supervisor).<br>3. Gathering and ladling with particular reference to weight required.<br>4. Placing glass in mould or dropping, according to the instructions of the presser.<br>5. Safe working practice and using protective equipment. |

## STAGE 3 - JOB TRAINING - PRESSER

Objective: To establish the recruit as an efficient and responsible presser who will be responsible for the overall efficiency of the chair or shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Positioning of press, setting up of press, setting bodies and rings, setting plugs, adjusting guides and cooling pipes.<br><br>2. Related departments - melting, mould manufacture and care of moulds, costs etc.<br><br>3. Responsibilities of being head of shop.<br><br>4. Mould temperatures, including practical demonstration. | 1. a. Position of press.<br>b. Setting up press.<br>c. Setting bodies and rings.<br>d. Setting plugs.<br>e. Adjusting guides and cooling pipes.<br><br>2. Cutting off glass and positioning.<br><br>3. Ensuring correct temperature of moulds by using skimmed glass.<br><br>4. Using press i.e.<br>a. placing body under plug in correct position.<br>b. using correct pressure to pull down lever.<br>c. adjusting cooling pipes.<br><br>5. Safe working practice and using protective equipment. |

# TRAINING PROGRAMME - PRESS & BLOW

INDUCTION TRAINING

STAGE 1 - PRELIMINARY TRAINING - TAKER IN AND BLOWER

STAGE 2 - JOB TRAINING - GATHERER AND LADLER

STAGE 3 - JOB TRAINING - PRESSER (PARISON MAKER), HEAD OF CHAIR OR SHOP

## STAGE 1 - PRELIMINARY TRAINING - TAKER-IN AND BLOWER

Objective: To assess the potential of the recruit and to ensure he can carry out the duties of a taker-in and understands the reasons for doing the job in a prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Duties of taker-in.<br>2. Glass faults visible at this stage.<br>3. Work of related department mixing, melting, costs.<br>4. Importance of good housekeeping.<br>5. Equipment used in blowing - duties of the blower.<br>6. Functions of forehearth.<br>7. Reasons for skimming, warming blowing irons and preparing noses. | 1. Carrying articles from press to lehr.<br>2. Packing articles in the lehr.<br>3. Identifying glass faults e.g. - crizzles, splits, shear marks, and slight flush.<br>4. Using equipment -<br>a. preparing tank<br>b. use of solphane (wetting agent)<br>c. warming irons<br>d. skimming.<br>5. Safe working practice and use of protective equipment. |

## STAGE 2 - JOB TRAINING - GATHERER AND LADLER

Objective: To establish the recruit as a responsible and efficient gatherer and ensure that he understands the reasons for doing the job in the prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Main duties of gatherer.<br>2. Interpreting job orders.<br>3. Irons, how to select an iron for a particular job.<br>4. Use of clay on irons.<br>5. Related departments - melting (including setting forebay mouth), temperature control and reasons for skimming.<br>6. Quality control and specifications with particular reference to weight. | 1. Use of irons, including selecting correct iron and the shaping of the clay nose.<br>2. Action to take for temperature adjustment.<br>3. Skimming and using this waste to heat moulds.<br>4. Gathering with particular reference to weight required.<br>5. Placing glass in mould or dropping, according to the instructions of the presser.<br>6. Safe working practice and using protective equipment. |

## STAGE 3 - JOB TRAINING PRESSER (PARISON MAKER)

## HEAD OF CHAIR OR SHOP

Objective: To establish the recruit as an efficient and responsible presser who will be responsible for the overall efficiency of the chair or shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Press and blow machine to include positioning, setting up of moulds, adjusting cooling pipes.<br><br>2. Related departments - melting, mould manufacture, care of moulds, costs etc.<br><br>3. Overall quality required from shop.<br><br>4. Responsibilities of being head of shop. (This may apply to the gatherer).<br><br>5. Mould temperatures. | 1. a. Positioning of machine.<br>b. Setting up mould equipment.<br>c. Adjusting cooling arrangement.<br><br>2. Cutting off glass and positioning.<br><br>3. Ensuring correct temperature of moulds by using skimmed glass.<br><br>4. Operation of machine.<br><br>5. Safe working practice and using protective equipment. |

TRAINING PROGRAMME - SCHILLER MACHINE (SUCK AND BLOW)

INDUCTION TRAINING

STAGE 1 - PRELIMINARY TRAINING - TAKER IN AND BLOWER

STAGE 2 - JOB TRAINING - GATHERER

STAGE 3 - JOB TRAINING - PARISON MAKER, CUTTER

## STAGE 1 - PRELIMINARY TRAINING - TAKER-IN AND BLOWER

Objective: To assess the potential of the recruit and to ensure he can carry out the duties of a taker-in and understands the reasons for doing the job in the prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Main duties of taker-in.<br>2. Glass faults visible at this stage.<br>3. Work of related departments - mixing, melting, costs.<br>4. Importance of good housekeeping.<br>5. Equipment used in blowing and duties of the blower.<br>6. Functions of forehearth.<br>7. Reasons for skimming, warming blowing irons and preparing noses. | 1. Carrying article from press to lehr.<br>2. Packing articles in the lehr.<br>3. Identifying glass faults - crizzles, splits, shear marks and slight flush.<br>4. Using equipment.<br>1. Preparing tank<br>2. Use of solphane (wetting agent)<br>3. Warming irons<br>4. Skimming<br>5. Safe working practice and use of protective equipment. |

## STAGE 2 - JOB TRAINING - GATHERER

Objective: To give the trainee a thorough understanding of gathering, the equipment to be used and the reasons for doing the job in a prescribed manner.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Equipment to be used in gathering - blocks etc.<br>2. Temperature recording systems.<br>3. Importance of gather being correct amount for the final article.<br>4. Related departments - mixing, melting, costs and inspection. | 1. Block correction.<br>2. Gathering of set amounts of glass.<br>3. Temperature adjustment.<br>4. Safe working practice and use of protective equipment.<br>5. Identifying glass faults. |

## STAGE 3 - JOB TRAINING - PRESSER

## (PARISON MAKER, CUTTER)

Objective: To establish the recruit as an efficient and responsible presser who will be responsible for the overall efficiency of the chair or shop.

| KNOWLEDGE | SKILLS |
|---|---|
| 1. Positioning of press, setting up of press, setting bodies and rings, setting plugs, adjusting guides and cooling pipes.<br><br>2. Related departments - melting, mould manufacture and care of moulds, costs, etc.<br><br>3. Overall quality required from shop.<br><br>4. Responsibilities of being head of shop.<br><br>5. Mould temperature, including practical demonstration. | 1. a. Positioning of press.<br>b. Setting up press.<br>c. Setting bodies and rings.<br>d. Setting plugs.<br>e. Adjusting guides and cooling pipes.<br><br>2. Cutting off glass and positioning.<br><br>3. Ensuring correct temperature of moulds by using skimmed glass.<br><br>4. Using press:<br>a. placing body under plug in correct position<br>b. using correct pressure to pull down lever<br>c. adjusting cooling pipes<br><br>5. Safe working practice and using protective equipment. |

## EXAMPLES OF TEST PAPERS

### 1) - HAND BLOWING (CLEAN IRON OR MARVER)

#### Theoretical

##### Instructions

There are a number of questions on this paper with three possible answers; a) b) c). **Ring** round the answer which you think is the correct one.

i) Which item of the following equipment is not used in gathering or blowing glass:

a) blowing iron

b) block

c) automatic press.

ii) The forehearth is:

a) an outlet of the tank for gathering purposes

b) a drain from the tank for batch

c) the part of the tank where the raw materials are fed in.

iii) The forehearth contains:

a) glass at the correct working temperature

b) unmelted raw materials

c) waste products.

iv) Skimming the tank is necessary:

a) to bring the irons to the correct heat

b) to provide batch for the next mix

c) to remove the scum from glass.

v) The blowing irons are warmed:

a) so that the glass will stick to the iron

b) so that they will not shatter when placed in tank

c) to warm the blower's hands.

vi) Clay noses are prepared to:

a) keep iron from melting

b) make knocking off surplus glass easy

c) for decoration.

vii - x) Other questions may be prepared to cover other subjects e.g. mixing, melting, costs and inspection.

Practical

i) The trainee should be tested in the practical aspects of warming irons and skimming:

a) Warming irons: The trainee should be given a set of blowing irons to warm and when he is satisfied they are the correct heat, the instructor should test by dipping them in the tank to see if the glass sticks to the iron.

b) Skimming: The trainee should be allowed to skim the tank and afterwards this is inspected by the instructor to see if it has been carried out satisfactorily.

ii) The trainee should be given several glass articles (each containing glass faults) to examine and identify the faults and causes to the instructor.

iii) The trainee should carry out the following sequence of operations:

a) Read and interpret a job order

b) Prepare the forebay for the job to be done

c) Select the correct iron for the job to be done

d) Select tank and forming block for the job to be done

These jobs should then be inspected by the instructor for faults.

## 2) HAND BLOWING (CLEAN IRON OR MARVER)

### Theoretical

#### Instructions

There are a number of questions on this paper with three possible answers; a) b) c). Ring round the answer which you think is correct:

i) Blowing irons are made from:

a) steel

b) iron

c) zinc

ii) Blocks are used for:

a) standing on to gather at the tank

b) cooling and shaping the glass

c) holding blowing irons when not in use.

iii) Why is it necessary to have temperature recording systems?

a) to ensure the glass is at the correct working temperature

b) to ensure the tank does not overflow

c) to keep the glass-house cool.

iv) Why is it important to ensure the correct amount of glass is being gathered?

a) too much glass may bend the iron

b) mould damage can occur

c) to make the final article the correct weight and thickness.

v to viii)

Other questions may be prepared to cover other subjects e.g. mixing, melting, costs, inspection, etc.

Practical

i) The trainee should be given specific weights to be gathered and each one should be weighed to ascertain accuracy. This can be done:

a) by using Aroclor

b) from the tank.

ii) Time spent gathering should also be tested; the time at the tank will vary slightly according to weight of article, but approx. 12-15 seconds is the experienced man's time. A graph can be prepared after each lesson and it should indicate that practice can reduce the time for the operation from 50 seconds to near 12-15 seconds.

iii) A combined test of the above can be simulated both by using Aroclor and at the tank.

A series of tests using the above will give an accurate guide to the trainee's progress in mastering gathering.

iv) The trainee can be given tests in setting blocks for articles to be made.

v) The trainee should be given several glass articles (each containing glass faults which occur at this stage) to examine and identity the faults, causes and remedies to the instructor.

## 3A) - HAND BLOWING (CLEAN IRON OR MARVER)

### Theoretical

#### Instructions

There are a number of questions on this paper with three possible answers; a) b) c). Ring round the answer which you think is correct.

i) Where is the gathering ring?

a) in the forebay

b) around the block

c) on the end of the iron.

ii) A bosh is:

a) the surface of glass

b) a short blowing iron

c) a tin bath containing solphane.

iii) Forming is sometimes called:

a) mixing

b) shaping

c) melting

iv) Plugging is needed to:

a) retain air in article

b) gather glass from tank

c) keep blowing iron clean

v) What service does quality control provide to you?

a) keeps temperature correct in tank

b) ensures correct mix

c) informs you of any faults occurring.

vi - x) Questions may be prepared to cover other subjects e.g. mixing, melting, inspection and costs.

Practical

i) The trainee should be given several articles to form and these should be inspected by the instructor for accurate length, width and glass thickness.

ii) Plugging can be tested using a simulated thumbing device comprising a glass U tube, red ink, rubber tubing and a blowing iron.

iii) Gathering - time at the tank and correct weight can be tested for a greater accuracy.

iv) Blowing - the trainee should be tested for the following by the instructor: position of glass in mould, placing of body in relation to iron, correct selection of iron for job and trainee's height, turning of article in mould.

v) Identification of glass faults for the whole process identifying faults, cause and remedy to instructor.

ERIC Clearinghouse

JUN 6 1970

on Adult Education

PREPARED AND PRINTED BY B.S.P. BOREHAM WOOD, ENGLAND. 580–169